

young are beautifully striped with dark brown or black, some specimens may even be described as black above with 5 or 6 light longitudinal streaks. Traces of this striation may persist in some males, but usually disappears entirely, the back being uniform brownish or dull green, with small blackish spots or vermicular lines on the sides. The figures annexed to this description will give an idea of the gorgeous colours assumed by the adult male during the breeding-season, making it one of the most beautiful of the European Lizards. The top of the head is of a reddish brown, sharply contrasting with the green colour of the nape, which gradually changes to olive or brown on the posterior part of the body; the sides of the head and body and the lower parts are of a bright vermilion-orange, relieved by a patch of azure-blue in the axillary region and a broad band of the same colour occupying the outer row of ventral shields and extending a little way up on the scaly part of the side. The female is of a reddish brown, with two broad blackish bands along each side, the outer proceeding from the eye, bordered above and below by a narrow whitish streak and separated by a third light streak which in some specimens is pale yellow, in others pale green; a small round blue spot is present above the axil; the hind limbs bear round light spots edged with blackish; the lower parts are white or pale yellow, often tinged with rosy or lilac on the sides.

Relationships.

Lacerta peloponnesiaca is most nearly related to *L. taurica*, and with it fills the gap between the massive Lizards like *L. agilis* and *L. viridis* and the forms that cluster round *L. muralis*. In its thick, convex skull and its well-developed pterygoid teeth, as well as in its temporal scutellation, it agrees with the former group, which I regard as the most generalized, whilst in its scaling and especially in its non-serrated collar it agrees very closely with the typical *L. muralis*, from which some authors have held it to be probably derived.

EXPLANATION OF PLATE I.

Lacerta peloponnesiaca, male and female, natural size.

- 4 Remarks on Two Species of Fishes of the Genus *Gobius*, from Observations made at Roscoff. By EDWARD G. BOULENGER *.

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Prof. F. Guitel, in his well-known paper on the breeding-habits of *Gobius minutus* †, remarks that the descriptions of this

* Communicated by G. A. BOULENGER, F.R.S., V.P.Z.S.

† Arch. Zool. Exp. et Gén. x. 1892, p. 499.

species by various authors vary to a considerable extent and that the fish described under this name by Collett* does not tally with the said Goby of Roscoff on which he based his observations, the number of scales along the lateral line in his specimens being about 45, those of the Norwegian fish about 60. Further that Collett's formula for the fin-rays—D. 6/11–12. A. 11—differs slightly from that of the Roscoff fish, which he gives as: D. 6/8–10. A. 8–10.

During a stay at Roscoff last summer I collected a number of specimens of the Goby described by Guitel under the name of *G. minutus* and also found there another Goby which differed at a first glance from the former in its larger size, coloration, and general appearance, and which I found on examination under a lens to have more numerous scales. This is the form described by Messrs. Holt and Byrne†, in their paper on the British and Irish Gobies, as the typical *G. minutus*, while the fish so commonly found at low tide in the pools of the shallow sandy bays of Roscoff is regarded by them as an estuarine race of the same species, to which they refer the *G. microps* of Kröyer‡ and later Scandinavian authors.

The colour of the latter fish is dorsally of a dirty grey, minutely speckled with black, laterally with large blackish blotches, which in the males usually expand into vertical bars on the side. That of the former is creamy speckled with rusty brown and with small blotches of the same colour laterally; the blotches may also form bars, which, however, are always finer and less conspicuous. I found the smaller form to be stouter than the larger, the depth of the body being usually from 5 to 6, as against 6 to 7 times in the total length, caudal fin excluded, and the scaleless area of the nape and back to be of greater extent.

These two fishes I found under quite different conditions—the *G. microps* of Kröyer close inshore, the one alluded to by Messrs. Holt and Byrne as the typical *G. minutus* at a locality north of the little island of Batz, opposite Roscoff, uncovered at the spring tides only.

From the table of particulars of the two forms, given further on, it will be seen that they differ both in number of scales and fin-rays; and there can be no doubt that the two fishes are distinct and well deserve to be regarded as valid species, not as races only.

Messrs. Holt and Byrne, however, are of opinion that a sufficient series of specimens from various localities would show a complete gradation from the one "race" to the other, and state that specimens from the Cuckmere river approach the typical form in the large number of scales and small scaleless area of the nape and

* Vidensk. Selsk. Forh. Christiania, 1874, p. 168.

† Report on the Sea and Inland Fisheries of Ireland for the Year 1901, Part ii. Appendix III. (1904).

‡ Danm. Fiske, i. p. 416 (1838–1840).

back, though in form and colour they resemble the estuarine race. I have examined several specimens in the British Museum from the Cuckmere, presented by Mr. Byrne, but find that both in appearance as well as in the number of scales they agree with *G. microps*.

It seemed desirable to make sure, by reference to the original description, which of the two species so often confounded should bear the name of *Gobius minutus*. This name was proposed by Pallas* for the fish ("*Maris Belgici*") described in a rather puzzling manner by Gronovius†, who gives the number of fin-rays characteristic of *G. microps*, while, on the other hand, the total length "*tres uncias*" (about 80 mm.) can apply only to the larger species. It is highly probable, however, that Gronovius had before him examples of both species from the Belgian coast‡, and that he noted the number of fin-rays from the smaller fish and added to his description the size attained by the larger. Gmelin's§ diagnosis "*albicans ferrugineo maculatus*, . . . D. 6, 11. A. 11" can only apply to *G. minutus* of most authors.

It is therefore satisfactory to find that no objection can be raised to the retention for the two species of the names used by the Scandinavian and other authors who have distinguished them.

The following is a tabulation of the specimens of the two species from Roscoff||:—

G. minutus.

Length.	Scales.	Fin-Rays.	
		D.	A.
55	66	VI. 12	11
53	67	VI. 12	11
53	65	VI. 12	12
53	64	VI. 12	12
50	63	VI. 12	12
49	71	VI. —	—
49	64	VI. 12	11
48	65	VI. 12	11
46	63	VI. 12	12
45	62	VI. 12	11
44	61	VI. —	11
39	63	VI. 12	12

* Spicil. Zool. viii. p. 4 (1770).

† Zoophylacium, p. 81. no. 276 (1763).

‡ Specimens of both *G. minutus* and *G. microps* from the Belgian coast were sent to the British Museum by the late Prof. E. van Beneden, and measurements of these will be found in the table at the end of this paper. The two species have hitherto been confounded by Belgian authors under the name of *G. minutus*.

§ Syst. Nat. i. p. 1199 (1788).

|| In these tables the length (in millimetres) is taken from the end of the snout to the base of the caudal fin. The scales are counted in a longitudinal series from the upper extremity of the gill-opening to the root of the caudal fin.

G. microps.

<i>Length.</i>	<i>Scales.</i>	<i>Fin-Rays.</i>	
		D.	A.
45	48	VI. 10	10
45	50	VI. 9	10
45	44	VI. 9	10
44	52	VI. 10	10
43	44	VI. 10	9
42	46	VI. 9	10
41	47	VI. 9	10
40	49	VI. 10	10
40	45	VI. 9	9
37	40	VI. 9	10
36	48	VI. 10	10
34	49	VI. 10	10

In order to satisfy myself as to the degree of constancy of these characters, I have examined a number of specimens in the British Museum collection from various localities, including the Cuckmere river and the Belgian coast.

The following table may be useful for purposes of comparison:—

G. minutus.

<i>Locality.</i>	<i>Length.</i>	<i>Scales.</i>	<i>Fin-Rays.</i>	
			D.	A.
Belgian coast (Van Beneden)	53	70	VI. 12	12
"	49	65	VI. 12	12
Weston-super-Mare ("Day)	60	70	VI. 11	11
Plymouth (Marine Biol. Assoc.) ...	70	71	VI. 12	12
"	57	72	VI. 12	12
Brighton (Children)	64	69	VI. 11	11
Firth of Forth	47	62	VI. 11	11
Burford Bank, Irish Sea (Byrne) ...	57	61	VI. 12	12
"	44	61	VI. 11	11
Corunna (Seoane)	70	73	VI. 11	11
"	70	67	VI. 11	11
"	66	71	VI. 11	11

G. microps.

Belgian coast (Van Beneden)	43	46	VI. 10	10
"	35	48	VI. 10	10
Weston-super-Mare (Day)	42	47	VI. 11	10
Cuckmere R., Sussex (Byrne)	43	46	VI. 10	10
"	41	47	VI. 10	10
"	41	45	VI. 10	11
"	36	52	VI. 10	10
"	35	42	VI. 10	10
S. Norway (Collett)	38	46	VI. 9	9
"	33	42	VI. 9	9
Denmark (Day)	33	44	VI. 11	10
"	32	44	VI. 10	10

As will be seen from these tables, *G. microps* has 9 or 10, exceptionally 11, rays in the 2nd dorsal and anal, *G. minutus* having 11 or 12; the number of scales along the lateral line, however, shows no overlap, not exceeding 52 in *G. microps* and not falling below 61 in *G. minutus*.

I therefore hope I have succeeded in settling the question of the correct name of the fish so carefully described by Prof. Guitel, about which he rightly entertained some doubts at the time of his observations on its remarkable breeding-habits.

The two forms here discussed have been quite correctly separated and identified by Messrs. Holt and Byrne; the only point on which I cannot agree with them is with regard to the existence of connecting-links, which the examination of a large material has failed to disclose.

In concluding this note, I wish to express my indebtedness to Prof. Yves Delage for kindly allowing me to work at the Roscoff Laboratory, of which he has the direction.

APPENDIX.

Col. Shepherd, who has devoted much time to the study of otoliths, has examined for me those of the two fishes from Roscoff, and finds their claim to specific distinction confirmed by the differences in this character.

He has kindly drawn up the following notes, as an appendix to my communication:—

“Under the microscope the otolith of *Gobius microps* shows as a quadrilateral lump with fairly equal sides. Two are at a right angle, but the angle is rounded off; a third is bulged out into an outward curve, the fourth forms an indent. The three sides first mentioned are plain-edged.

“The otolith of *Gobius minutus* shows an irregular quadrilateral shape: one side is straight and plain; the other three sides are not so symmetrically shaped as in *G. microps*, and are markedly scalloped, there being six lobes on the edges of the three sides, these lobes not regularly spaced, but of varying size.

“This would show that the two fishes are different species.

“The otoliths referred to are in each instance the sagitta.”

EXHIBITIONS AND NOTICES.

November 29th, 1910.

Dr. HENRY WOODWARD, F.R.S., Vice-President,
in the Chair.

Dr. WILLIAM NICOLL, of the Lister Institute of Preventive Medicine, gave a demonstration of his method for the collection of Trematodes.

Dr. R. T. LEIPER, F.Z.S., exhibited two photographs and some specimens showing the Nematode infection known as Onchocerciasis in beef imported from Queensland.

Dr. J. F. GEMMILL, M.A., D.Sc., Lecturer on Embryology in the University of Glasgow, gave an account, illustrated by lantern-slides and specimens, of his memoir on "The Development of *Solaster endeca* Forbes," communicated to the Society by Prof. J. Arthur Thomson, F.Z.S.

This memoir will be published entire in the Society's 'Transactions' in due course.

Mr. D. SETH-SMITH, F.Z.S., the Society's Curator of Birds, exhibited living examples of the Australian Budgerigar or Undulated Grass-Parrakeet (*Melopsittacus undulatus*), showing three colour-phases. The normal bird was mostly green, with a yellow face, dark barring across the occiput and back, and blue on the tail-feathers.

The yellow variety was now common as a cage-bird, and had been known to occur in a wild state. In it the dark pigment had disappeared and practically all trace of blue had been eliminated, though some spots on the cheek, which in the normal bird were deep indigo-blue, retained a faint bluish tinge.

The third variety was an extremely rare one, in which all the yellow pigment had gone, leaving the bird almost entirely blue. Those parts which in the normal bird were green, were in this variety pale blue, while the face, which was yellow in the normal bird, was pure white.

Blue Budgerigars appeared to have been known in Belgium and France some twenty-five or thirty years ago, as they were mentioned by Greene in his 'Parrots in Captivity' (i. 117) and others of his books, and by Wiener in Cassell's 'Canaries and Cage Birds.' The variety seemed to have been entirely lost sight of, however, in this country at any rate, until M. Pauwels, a well-known Belgian aviculturist, exhibited a pair at a bird-show held at the Royal Horticultural Society's Hall at Westminster on November 25th-28th, 1910. This gentleman had several of these birds, which were said to breed true to type, but to produce a preponderance of females.

Mr. Seth-Smith pointed out that, so far, no systematic breeding experiments had been carried out with Budgerigars, but with three distinct colour-phases of a free-breeding species to work with, the material for some very interesting experimental breeding was at hand.

He acknowledged his indebtedness to M. Pauwels for the loan of the blue specimen exhibited at the meeting.

PAPERS.

5. On a Possible Cause of Pneumo-enteritis in the Red Grouse (*Lagopus scoticus*). By H. B. FANTHAM, D.Sc., B.A., F.Z.S., and H. HAMMOND SMITH, M.R.C.S., L.R.C.P., F.Z.S.

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The importance of Coccidiosis as a serious disease of the digestive tract of birds has lately been clearly established by Fantham in England in the case of young Grouse and Pheasants, and by Morse and Hadley in America in Fowls and Turkeys.

While pursuing our researches at the Frimley Experimental Farm belonging to the Grouse Disease Inquiry Committee during the summer of 1910, we found that out of 40 Grouse chicks hatched, 17 died between the ages of 4 and 6 weeks. These birds were examined by both of us and were found to be suffering from Coccidiosis, the parasites (*Eimeria* (*Coccidium*) *avium*) occurring especially in the duodenum and caeca. Many of these young birds, however, also presented symptoms of pneumonia, consequently the lungs, trachea, and bronchi of the birds were most carefully examined. The results of our examination were most interesting, for we both found coccidian oöcysts in the trachea, bronchi, and bronchioles. Inside these oöcysts the processes of formation of the four sporoblasts were sometimes found to be going on. The oöcysts were probably acquired by the mouth, and a few of them, instead of passing directly down the digestive tract, as is usual, may have found their way, *via* the glottis, into the trachea and bronchioles. It is possible that these coccidian cysts in the bronchioles would be quite capable of setting up sufficient irritation to account for the pneumonic symptoms seen in the lungs of these young birds. It would seem, therefore, that the old name of pneumo-enteritis, as applied by Mr. Tegetmeier and others to one of the diseases that caused mortality in Grouse—a view which has met with much criticism—may after all be proved to have some foundation in fact.

References to Literature.

- COLE, L. J., and HADLEY, P. B. (1910).—"Blackhead in Turkeys, a Study in Avian Coccidiosis." Bulletin 141, Agric. Expt. Station, Rhode Island State College.
- FANTHAM, H. B. (1910).—"On the Morphology and Life-History of *Eimeria* (*Coccidium*) *avium*, a Sporozoön causing a Fatal